

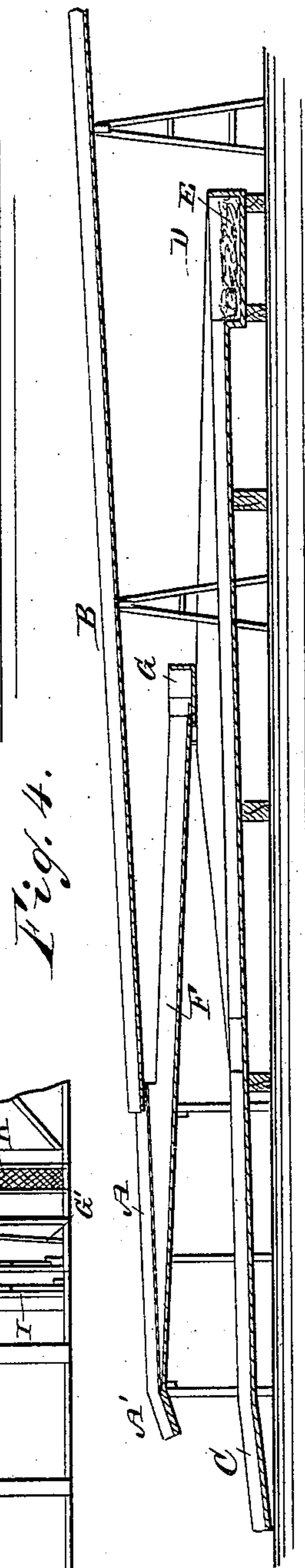
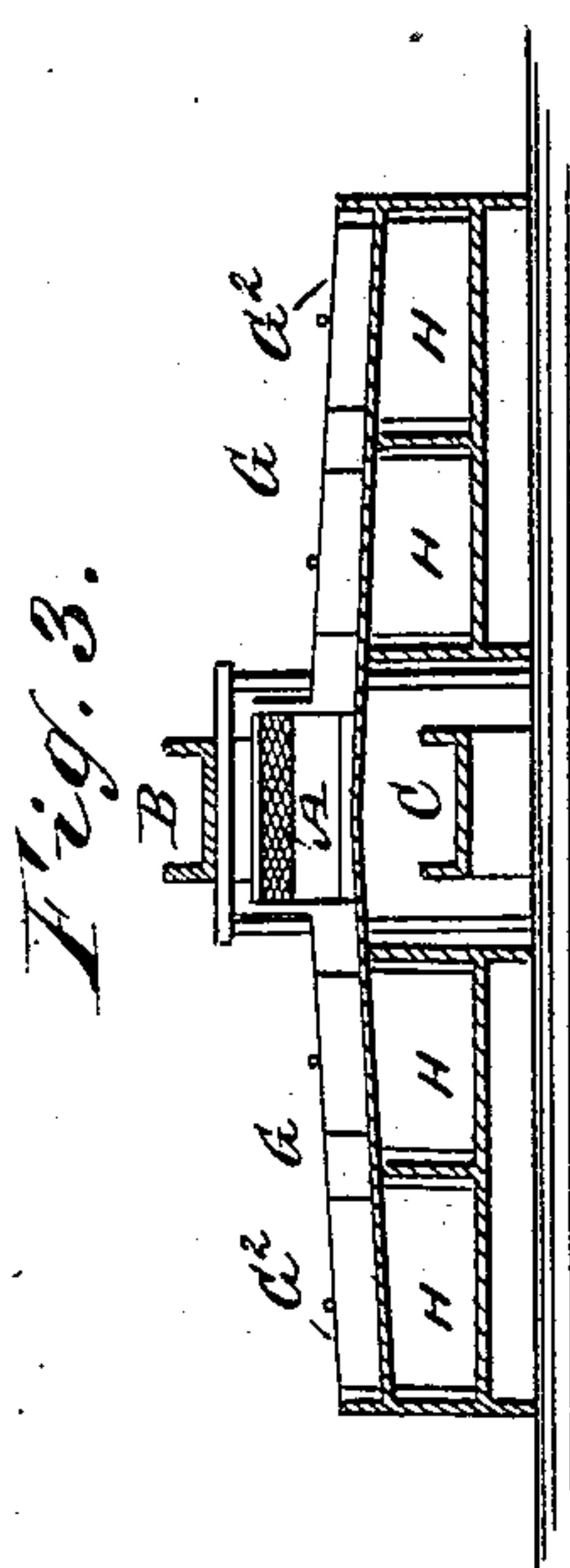
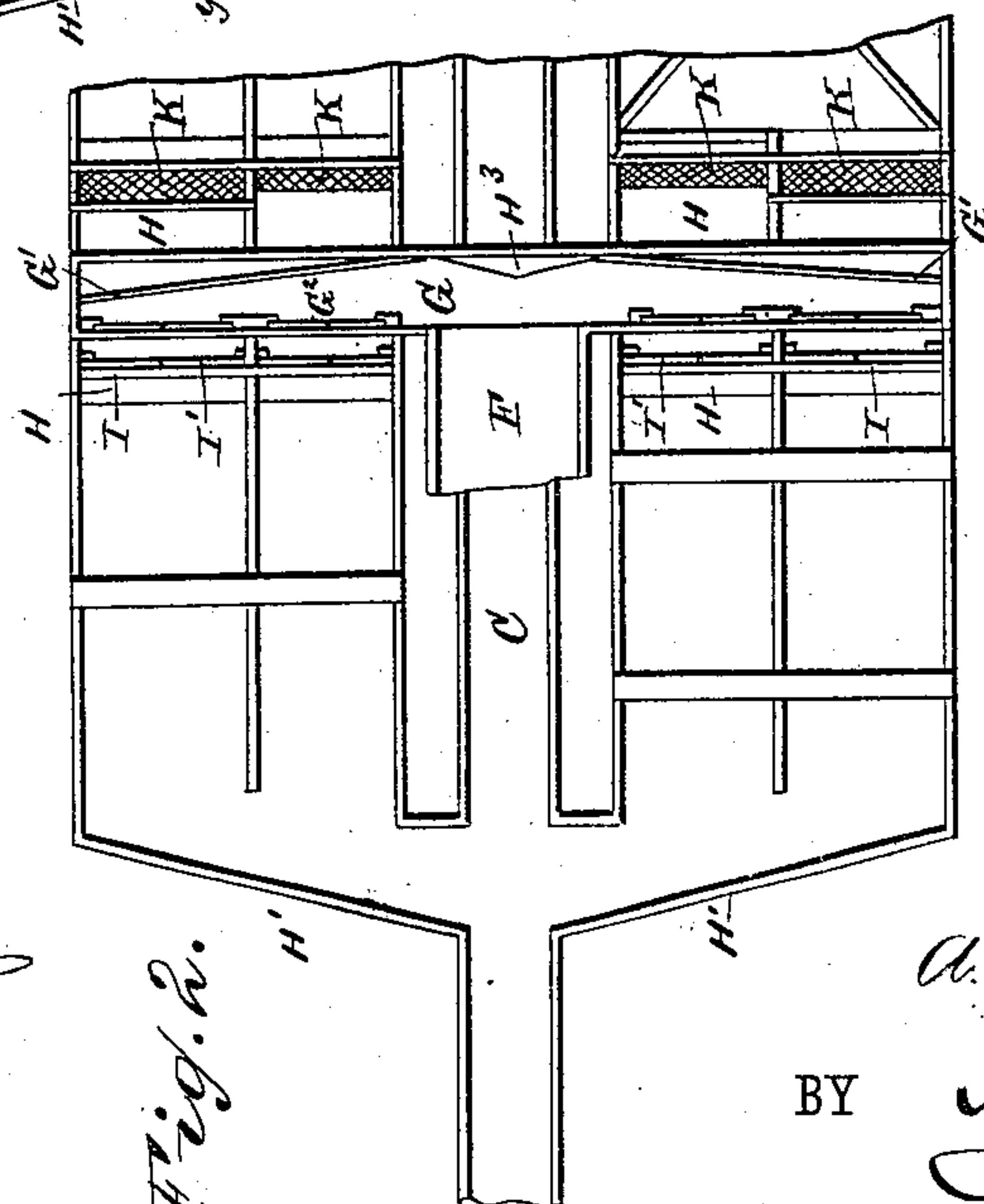
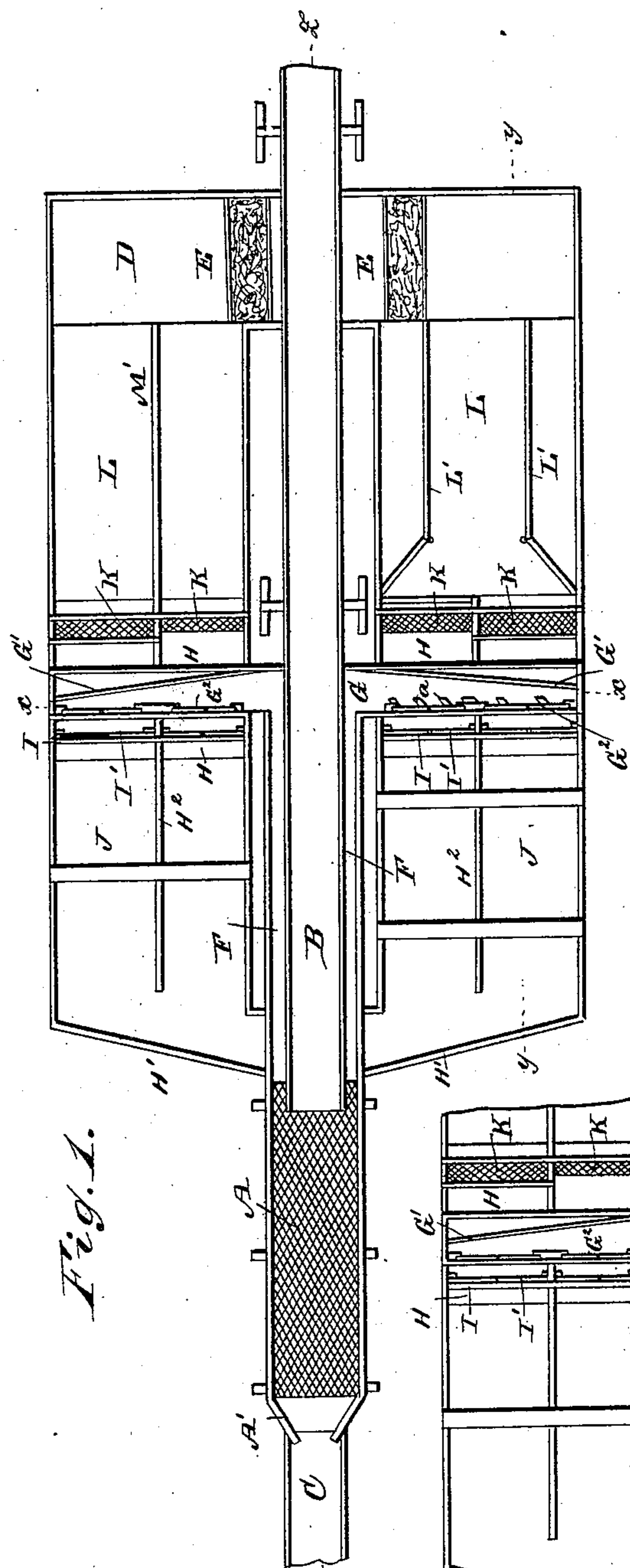
(No Model.)

2 Sheets—Sheet 1.

A. D. CLARKE.
ORE CONCENTRATOR.

No. 291,984.

Patented Jan. 15, 1884.



WITNESSES:

Thos. G. Hostrut
C. Sedgwick

INVENTOR:

A. D. Clarke

BY

Munn & Co
ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 5.

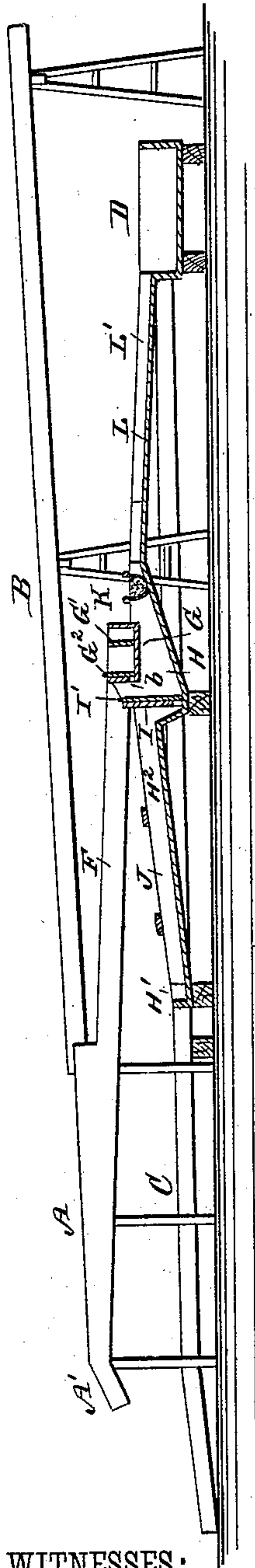
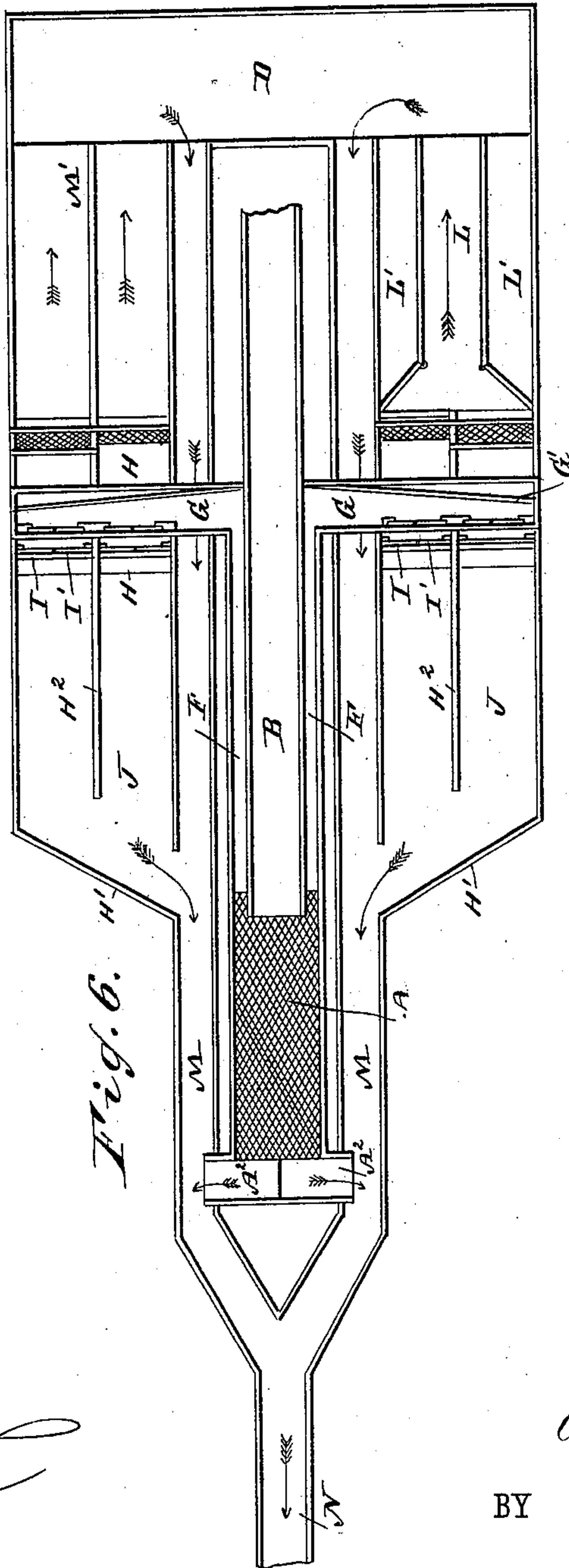


Fig. 6.



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UNITED STATES PATENT OFFICE.

ALEXANDER D. CLARKE, OF NEW YORK, N. Y.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 291,984, dated January 15, 1884.

Application filed October 4, 1883. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER D. CLARKE, of the city, county, and State of New York, have invented a new and Improved Ore-Concentrator, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved device for concentrating ore in placer-mining by washing off and removing particles of sand and catching the heavy and float gold.

The invention consists in an ore-concentrator with a screen, upon which the water containing the sand, ore, &c., is conducted by an inclined chute, from which screen another inclined chute conducts the water to a transverse gutter, from which it flows into suitable settling-tanks, &c., the chute that conducts the water from the screen being inclined in the inverse direction from the chute that conducts the water upon the screen.

The invention also consists in various parts and numerous combinations of the same, as will be fully described and claimed hereinafter.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of my improved ore-concentrator. Fig. 2 is a plan view of the same with the top chute removed and parts broken out. Fig. 3 is a cross-sectional elevation of the same on the line *x x*, Fig. 1. Fig. 4 is a longitudinal sectional elevation of the same on the line *z z*, Fig. 1. Fig. 5 is a longitudinal and a partly-sectional elevation of the same on the line *y y*, Fig. 1. Fig. 6 is a plan view of a modification of the same.

The water containing the sand with which the gold is mixed is conducted upon an inclined screen, A, by an inclined chute, B, connected with a suitable flume for conducting the water. At its lower end the screen A is provided with a spout or short chute, A', upon which the stones, &c., that remain on the screen can slide and can drop from the same upon a chute, C, which has about the same inclination as and is arranged under the chute B, and extends from a transverse tank or box, D, down to a gutter or chute for carrying off the stones, &c., or can be extended to the river

or to any other place where the stones, &c., are to be deposited. The transverse tank D is provided with a filter, E, at each side of the rear end opening of the chute C, which filter may consist of a cage filled with sage-brush, shavings, &c.

Below the screen A a chute, F, is provided, which is inclined in the inverse direction of the chutes B and C, the lower end of the said chute F being connected to a transverse gutter, G, the bottom of which is inclined outward and downward from the lower end of the chute F. The transverse gutter G is provided with partitions G', which are inclined from the middle of the box toward the ends and toward the front of the gutter, so as to throw the water rushing from the chute F into the gutter G toward the front side of the said gutter. On the upper surface of the bottom of the gutter a series of riffles, *a*, are provided, which are inclined from the rear toward the front of the gutter and from the middle toward the ends, as shown in Fig. 1, which riffles conduct the water toward openings *b*, formed in the bottom of the front of the gutter, which openings can be closed by vertically-sliding gates G². From the bottom of the gutter G the water flows into a settling box, tank, or pocket, H, the front of which is inclined upward at quite an acute angle and the rear of which is inclined backward at an obtuse angle. From the top of the front of the pocket an inclined platform, J, extends downward and forms a chute, provided at its front with an inclined wall, H', which conducts the water into the chute C. The inclined platform J is divided into two or more parts by one or more longitudinal vertical partitions, H².

At the angle formed at the bottom of the settling box or pocket H a vertical partition, I, is erected, parallel with the length of the said pocket, which partition is provided at the bottom with openings, which can be closed by vertically-sliding gates I', by means of which gates the quantity of water and sand flowing from the pocket over the inclined platform J can be regulated.

At the rear end of the pocket H a basket, K, is provided, parallel with the gutter G and with the pocket H, which basket contains filtering materials, through which the water pass-

ing from the pocket H toward the rear must pass. From the rear of the pocket an inclined platform, L, extends down toward the tank D, on which inclined platform L two or more hinged vertical partitions, L', as shown in Figs. 1 and 6, are provided, which divide the platform L into two or more parts, which partitions can be adjusted to make the space through which the water can pass wider or narrower, according to the speed, &c., that the water is to have.

If desired, a wedge-shaped block, H³, can be provided in the middle of the rear wall of the gutter G, to conduct the water toward the two ends of the gutter, as shown in Fig. 2.

In place of having one platform J and one platform L, each subdivided into several parts, in accordance with the number of tanks H, each tank, if more than one are provided, may have its own platform or platforms independent of the platforms of the other tanks. In case one platform J or L is provided, the surface may be subdivided in accordance with the number of tanks; but all subdivisions must have the same inclination. If each tank has a separate platform, they may have different inclines.

The operation in a placer-mine is as follows: The machine, having been set up, is connected with the mine by a continuation of the sluice or chute B. In the head of this sluice, where it leaves the mine, is put a gate, which holds back the auriferous gravel or earth for a short time, while it permits the water to flow over it. The water, having been turned on, flows over the gate in the head of the sluice or chute B, passes through the screen A, falls upon the apron or chute F, by which it is conducted into the transverse gutter G, and by this gutter distributed into the tanks H, and the gates I' being closed, it flows over the inclined platform L into the tank D, and through the filter E to the chute C, by which it finds its way to the dump. When a current of water is running through the chute C strong enough to carry off any stones that may drop into it from the screen A through the chute A', the gate in the head of the sluice is taken out or raised, so that the gravel may be carried by the water flowing through sluice or chute B to the concentrator. The particles of gold and sand fine enough to pass with the water through the openings in the screen A fall upon the apron, sluice, or chute F, and are by it conducted into the transverse gutter G, and are conducted by the riffles *a* through the openings *b* into the tank H. Should there be any nuggets of gold in the gravel too large to go through the screen A, they can be saved by ordinary riffles placed in sluice or chute C below the point where the stones drop into it from chute A'. When the gravel has commenced to come down and the sand has begun to find its way into the tank H, the doors I' in the partition I are raised, so as to permit the heavy sand and gold which sink to the bot-

tom of the tank H to pass upward and over the front of the said tank onto the platform J, on which blankets, amalgamated plates, or riffles may be placed to catch the particles of gold. The sand will be carried upward and over the front of tank H, because the column of water on the inside of partition I next to the transverse gutter G will be always several inches higher than it is on the outside. The water at the bottom of tank H is forced out as long as the gate I' is left open, carrying the sand with it. The heavy sand and gold pass out of the tank H as fast as they come in, and they are flowed directly over the blankets, amalgamated plates, or riffles on platform J and lodged thereon, the water flowing into the chute C, where it assists in carrying off the stones that drop into chute C from chute A'.

As no table or platform, whether covered with blankets, amalgamated plates, or riffles, should have more sand than it can take care of properly, the flow of the water and sand into each tank H and over its corresponding tables or platforms J and L is regulated by the vertically-sliding gates G² in transverse gutter G and I' in partition I. By means of these gates any tank may be shut off when it is desired to clean up the blankets, amalgamated plates, or riffles over which the sand and water from this particular tank flow, while the rest of the concentrator runs on. A sufficient number of tanks H is placed upon each side of the chute B to take care of all the sand and gold heavy enough to sink in the water in said tanks H. Should any of the tanks become filled and the heavy sand begin to find its way over the platform L, it shows that that particular tank is getting too much sand, and a portion of the sand must be diverted to some other tank, or the number of tanks must be increased. No particles of sand or gold but such as are light enough to float upon or be held in suspension in the water should pass over the platform L, on which blankets or amalgamated plates can be placed, if desired. Under some conditions it may be necessary that the greater portion of the water should pass over the platform J, in which case there may not be enough left to flow over the whole of the inclined surface of the platform L. In this case two hinged vertical partitions, L', are provided, which can be adjusted to make the space through which the water can pass wider or narrower, according to the quantity of water and the speed it is desired it should have. When the greater portion of the water passes over platform L, then each tank H should have its own portion of platform L intact, and the surface of the platform L would be subdivided into as many parts, by longitudinal partitions, as there are tanks H. There are two currents flowing simultaneously, one carrying the heavy sand and gold over platform J, the other current carrying the floating particles over platform L, if not arrested

by the filters K. If they escape filters K and do not fall to the surface of the blanket or amalgamated plates in the very slow and gentle current which flows over platform L, they are caught by filters E before the water finally escapes into chute C.

In the modification shown in Fig. 6, the water is conducted by the chute B upon the screen A, and at the ends of the screen two laterally-inclined chutes, A², are provided, to conduct the stones into two chutes, M M, which are inclined downward from the tank D, about parallel with the chute B, but below the same. At the front the two chutes M are united to form one chute, N, to conduct the water, &c., down to the river, the water flowing down the inclined platform J and into the chutes M. Otherwise the construction is the same as described above.

In place of providing the hinged partitions L' on the incline L, a single longitudinal partition, M', can be provided, which divides the incline L into two parts, as shown in one part of Fig. 6.

It will be observed that all the water that passes through the apparatus is used to carry off the stones that have been carried over the screen A by the water rushing through the chute B. In order that the water that flows from the pockets H may have sufficient headway when it arrives at the end of the chute C, the chute F must be inclined in the inverse direction of the chute B—that is, the water that is to carry off the stones, &c., must begin to flow downward some distance back from the front end of the screen A or chute C, which distance must be sufficient to give the water the desired headway. The essential features remain the same in the modification, as in both cases the water, after having passed through the screen, so as to separate the stones from the sand, &c., passes into a gutter, G, and, when the heavy particles of sand are separated by gravitation from the float, gold is carried backward over suitably-inclined platforms into a tank containing filters, and the heavy sand containing the particles of gold is washed upward and over blankets in front of the gutter, so that the particles of gold adhere to the blankets or amalgamated plates placed on the said inclined platforms, and in all cases all the water is used for carrying off the stones, &c.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, in an ore-concentrator, of an inclined chute for conducting the water containing the sand, ore, &c., the screen for receiving the same, an additional chute inclined downward in the inverse or opposite direction of the first-mentioned chute, and settling tanks or boxes, substantially as herein shown and described, and for the purpose set forth.

2. In an ore-concentrator, the combination, with an inclined chute, of a screen arranged

at the lower end of the same, a chute inclined from the bottom of the screen in the inverse or opposite direction of the chute through which the water is conducted upon the screen, a transverse gutter arranged at the lower end of the latter chute, and a settling-tank into which the water is conducted that flows from the gutter, substantially as herein shown and described, and for the purpose set forth.

3. In an ore-concentrator, the combination, with an inclined chute, B, of a screen, A, upon which the water, stones, and sand are conducted by the said chute B, a chute, F, inclined from the screen A in the inverse or opposite direction of the chute B, and a transverse gutter, G, at the lower end of the chute F, the chute C, inclined about in the same direction as the said chute B, into which chute C the water is conducted which has passed into the transverse gutter G, substantially as herein shown and described, and for the purpose set forth.

4. In an ore-concentrator, the combination, with the inclined chute B, of the screen A at the lower end of the same, the chute F, inclined from the screen in the inverse direction of the chute B, a transverse gutter, G, at the base of the chute F, a settling-tank below the chute F, inclined platforms at the front and rear of the said settling tank or pocket, and a chute, C, inclined in the same direction as the chute B, into which chute C water from the settling tank or pocket is conducted, substantially as herein shown and described, and for the purpose set forth.

5. In an ore-concentrator, the combination, with a chute, B, of a screen, A, arranged at the lower end of the same, a chute, F, inclined from the screen in the inverse direction of the chute B, a transverse gutter, G, at the lower end of the chute F, a settling tank or pocket, H, a tank, D, and the chute C, substantially as herein shown and described, and for the purpose set forth.

6. In an ore-concentrator, the combination, with the chute F, of the transverse gutter G, into which water is conducted, the gates G², for closing the apertures *b* in the front of the gutter, and the inclined riffles *a* on the floor of the gutter, substantially as herein shown and described, and for the purpose set forth.

7. In an ore-concentrator, the combination, with the chute F, of the transverse gutter G, provided with apertures *b*, gates G², the pocket or settling-tank H, the partition I, and the gates I', substantially as herein shown and described, and for the purpose set forth.

8. In an ore-concentrator, the combination, with the chute F, of the transverse gutter G, the settling tank or pocket H, into which the water flows from the gutter G, and a filter arranged in the settling tank or pocket H in front of or behind the gutter G, substantially as herein shown and described, and for the purpose set forth.

9. In an ore-concentrator, the combination,

with an inclined chute, B, of a screen, A, at the lower end of the same, a chute, F, inclined from the screen A in the inverse direction of the chute B, a transverse gutter, G, at the base of the chute F, tanks or pockets H, the chute C, inclined about in the same direction as the chute B, and means for conducting the water that flows from the gutter G into settling tanks or pockets and into the chute C, substantially as herein shown and described, and for the purpose set forth.

10. The combination, with an inclined chute,

B, of the screen A, the chute F, the transverse gutter G, the settling tank or pocket H, the partitions I, having gates I', the inclined platform J in front of the settling tank or pocket H, and one or more partitions, H², extending longitudinally over the said inclined platform, substantially as herein shown and described, and for the purpose set forth.

ALEXANDER D. CLARKE.

Witnesses:

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